Determination of Average Dry Weather Flow to the Peirce Island Treatment Plant
January 6, 2011

Because of the limited space available for an upgrade at the Peirce Island WWTF, it is necessary to determine the appropriate dry weather sanitary flows to use for design. The purpose of the exercise described below was to determine what the average dry weather flow is for the Peirce Island WWTF and the appropriate peaking factor (PF) to use during design.

The EPA defines Wet-Weather Flow as any storm generated flow (e.g. rain or snowmelt).
Total daily flow data for the Peirce Island WWTF was compiled from July 2008 to November 2010 and compared to rainfall and temperature data for the same period in order to determine when rain or snow melt events were affecting the flow. In order to determine the average dry-weather flow, total flow data points considered to be influenced by wet-weather flow were excluded. Flow data points were excluded according to the following guidelines:

For storm events occurring in late spring, summer, and fall:

1. Isolated single-day event - Only day of event (or following day if event was deemed to occur at night) was excluded
2. Multi-day event – Excluded days stating at flow spike and continue until flow stabilizes including no more than one day of 0 inches rain at the end of the event
3. Discretion was used for particularly large rainfall or lengthy events as to the number of 0 inch days that it was appropriate to include after the event.

For events occurring in winter and early spring:

1. Events occurring when temperature is above freezing shall be treated as described above.
2. Events occurring in sub-freezing maximum temperatures were considered snow fall and day(s) were not excluded
3. When maximum temperatures rise above freezing after a snow fall event, a snowmelt event was assumed – Excluded days until temperature reaches freezing again, or temperature remains above freezing for 2 days.
4. Discretion was used when rain and snow events occur in close proximity to each other or when obvious snows melt occurred not in conjunction with a storm as to which days it was appropriate to exclude.

The attached worksheets show the base flow, rainfall and temperature data used to identify wet weather events. Those data points to be excluded are highlighted. The "Dry Flow" file shows the dry weather flows with wet weather events excluded. The average dry weather flow was found to be 4.4 mgd. The "Percentiles" sheet was created to identify the 99 percentile peak flow. Using a standard 2:1 PF on the average of 4.4 mgd the calculated peak flow would be 8.8 mgd which is larger than the 7.9 mgd flow which equates to the 99th percentile. Therefore, the actual peak flow ranges between 7.9 mgd and 8.8 mgd.

It should be noted that this analysis has been based on historical data. The City is currently involved in an extensive sewer separation project. It is expected that the influence of inflow during wet weather events and the subsequent infiltration which occurs from high groundwater in dry weather will be further reduced as this project progresses.